

CLAIMS

1 1. A network of inter-connectable optical fibers equipped, at strategic locations, with
2 devices that can respond to optical signals emanating from a particular source as part of a
3 message or data stream to determine the destination and select suitable fibers to assure its
4 arrival at the point of destination, using at said locations

5 a. lambda-extractor switches for single frequencies to signal the switching
6 logic;

7 b. nanosecond responsive switches to re-direct the data flow into appropri-
8 ate other optical fibers on an instantaneous time basis;

9 c. massive cross-connecting switches that enable the connection to any in-
10 coming fiber to any outgoing fiber within one module in a mechanically
11 asynchronous manner.

1 2. The network according to claim 1 in which the message to be sent is preceded by
2 optical code signals that identify the destination causing the setting up of the appropriate
3 photonic switches to connect the incoming fiber to the relevant outgoing fiber using the
4 switch configuration and network architecture described herein.

1 3. The network according to claim 1 wherein a lambda extractor device that is able
2 to extract individual single frequencies from a glass fiber that carries many frequencies in
3 parallel, said single frequency being useful, as part of other single frequencies, to operate
4 a logic circuit which sets the photonic switches according to claim 2.

1 4. The network according to claim 1 wherein the nanosecond switch for optical data
2 streams operates with polarized light and Brewster Angle reflection or transmission in
3 accordance with the polarity of the incoming and/or outgoing light.

1 5. The network defined in claim 1 wherein each of said cross switch connect any
2 incoming fiber in a given space to any outgoing fiber in said space using optical projec-
3 tion between designated, switchable fibers.

1 6. A method of achieving cross-switching of optical signals from various fiber ends
2 to other various fiber beginnings, which method features a space across which the optical
3 signals are transmitted, that method allowing any X/Y location within a matrix pattern to
4 be addressed by obliquely aimed laser beams converting said space to achieve an optical
5 connection between input and output.

1 7. A cross-connecting switch which operates according to the method defined in
2 claim 11 whereby said switch feature two planes in juxtaposition, with light beams trav-
3 ersing said space from a first plate aiming at a second plate, with said first plate possess-
4 ing one or more fiber entries, at the end of which at each location a tiltable mini lens is
5 mounted whose position is controllable to aim at any X/Y point in the second plate across
6 the intervening space so as to project a coherent laser beam across that space where col-
7 lector lenses at each fiber end take the incoming light at the specific respective fiber at
8 which it is aimed in order to convey the data stream represented by the light to a new
9 outgoing station.

1 8. A cross-connect optical switch to achieve individual cross communications trav-
2 ersing said space from one incoming fiber, or any number thereof, to a second fiber, or
3 any selected number thereon, on the second plate, with aid light beams being able to
4 criss-cross each other in the space between the plate so as to simultaneously cross-
5 connect optical data points for the purpose of sending them on their way to their respec-
6 tive destinations.

1 9. A network according to claim 1 including means for aiming the light beams using
2 optical signals of pre-selected frequencies that contain the switching information neces-
3 sary to be able to cross-connect from the entry position in name one to the exit position in
4 name two, with said frequencies being extracted from the respective fibers via resonant
5 couplers and then submitted to photo resistors and microprocessors which translate the
6 incoming signals to the geometric X/Y position at which the incoming beams must be
7 aimed.

1 10. A network according to claim 2 including a plate one and a plate two contained in
2 a module or package with the fibers ending on plate one each being connected to its own
3 little oculus which is tiltable in the vertical and in the horizontal direction so its exiting,
4 collimated laser beam can be aimed at a selected location on plate two where a collector
5 lens receive the laser beam and enters it into the outgoing fiber to send it on its way to-
6 wards its destination.

1 11. A network according to claim 2 into which many fibers are inserted with each fi-
2 ber ending in an oculus so as to create a plate in which many oculi can individually be
3 rotated and tilted so as to feature a criss-crossing of invisible laser beams across a space
4 providing photonic coupling without first pre-converting to electrons and then generating
5 photons, with said oculi enabling the criss-crossing of photonic information from one
6 plane to another plane by aiming said oculi in various, independently selectable positions.

1 12. A network lens according to claim 2, wherein within the spherical body of oculus
2 is a minlens that collects the light exiting from the fiber that is tied to the end of the ocu-
3 lus and from there funneling the collected light towards a collimator lens so as to gener-
4 ate a parallel laser beam output whose direction can aim transversely across a space at a
5 selected collector, lens with the distance from the oculus to said collector lens being o no
6 consequence since the laser beam is parallel by nature and tiny in diameter without being
7 affected by dispersion events.

1 13. A network as described in claim 1 where an incoming fiber carries two types of
2 information, with the first information representing the switching instructions for the oc-
3 uli and the other frequencies being operative to convey information such as speech or
4 data or video information, said system flowing the cross connection from a first area of
5 activity to a second area of activity, with the cross switch being the crucial element in the
6 system because of its ability to route information to its various points of destination and
7 to do so by purely optical means.

1 14. An oculus consisting of a spherical shape preferably made of glass that can rotate
2 like an eyeball in its socket, with said glass containing an equatorial electrode on its out-
3 side that is able to interact with a variety of electrodes inscribed in the holding plate so as
4 to allow, when activated, to tilt the oculus up or down or left and right to aim it at an X/Y
5 location across the space using these fine electrode gratings to cause the adjustment of the
6 oculus position through electrical attraction or other means in accordance with an entry
7 signal.

equipped with a variety of electrodes inscribed in the holding plate so as to allow, when activated, to tilt the oculus up or down or left and right to aim it at an X/Y location across the space using these fine electrode gratings to cause the adjustment of the oculus position through electrical attraction or other means in accordance with an entry signal.